UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/584,687	04/19/2007	Claes-Goran Johansson	AWEK 3.3-001	7362

530 7590 01/03/2012

LERNER, DAVID, LITTENBERG,
KRUMHOLZ & MENTLIK
600 SOUTH AVENUE WEST
WESTFIELD, NJ 07090

EXAMINER	
JONES, HUGH M	

ART UNIT	PAPER NUMBER
2128	

MAIL DATE	DELIVERY MODE
01/03/2012	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/584,687	JOHANSSON ET AL.	
	Examiner	**Art Unit**	
	HUGH JONES	2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 February 2011*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

5)☒ Claim(s) *1-7 and 11* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-7 and 11* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☒ The drawing(s) filed on *27 June 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

12)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *4/19/2007*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-7, 11 of US Application 10/584,687, filed 6/27/2006, are presented.

Claim Objections

2. Claim 4 is objected to because of the following informalities: there are two commas in line 4 (one is redundant). Appropriate correction is required.

Claim Interpretation

3. Process claims 1-7 were analyzed under 35 USC 101. It is recognized that, in order to be statutory, a process claim must not be directed to abstract ideas. This requirement *may* be met if the process is 1) tied to a particular machine or apparatus, or 2) transform a particular article into a different state or thing. *In re Bilski*, 88 USPQ2d 1385 (2008). It is also recognized that a general purpose computer may be converted into a particular computer through the operation of software on the computer. *In re Alappat*, 31 USPQ2d 1545 (1994).

4. The *Interim Bilski Guidance* (2010) provides additional factors to aid in *the* determination of whether a claimed method that fails the machine-transformation test is nonetheless patent eligible *(i.e.,* is not an abstract idea), and also whether a claimed method that meets the machine-or-transformation test is nonetheless patent-ineligible (i.e., is an abstract idea).

5. For the instant invention, the *process* is carried out via software operating on a computer (claim 1, lim 1: ‘by means of a computing device’). The claims are statutory.

6. Claim 11 is a system claim, and requires a processor (limitation 4). Limitations 1-3 are also directed to tangible devices. These claims are statutory as well.

7. The recitation of 'by means of' as in claim 1, for example, does not invoke 35 U.S.C. 112, Sixth Paragraph, since the phrase "means for" is not recited (see MPEP 2181: Identifying a 35 U.S.C. 112 , Sixth Paragraph Limitation).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

> The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows: Determining the scope and contents of the prior art. Ascertaining the differences between the prior art and the claims at issue. Resolving the level of ordinary skill in the pertinent art. Considering objective evidence present in the application indicating obviousness or nonobviousness.

> This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 1-7 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over ***"A Study of the Noise From Diesel Engines Using the Independent Component Analysis" by Li et al (hereinafter as Li)*** in view of ***Johansson et al (US Pat. No. 6,167984 B1)(hereinafter as Johansson - inventor)*** further in view of ***Galaitsis (US Pat. No. 6,454,047).***.

10. ***Li discloses:*** As per claim 1, a method for supplying a system for sound attenuation of noise relating to an exhaust system of exhaust gases from a high power combustion engine, the method comprising:

adding to a model of the exhaust system, by means of a computing device **(i.e. page 1172, § 4. Numerical Study, ¶ 2 of section, lines 1-2, teaches simulated source**

signal which necessitate a computing device), a plurality of elements **(i.e. Fig. 1-2 and page 1167, § 2.2. The Intake and Exhaust Noise, ¶ 1, lines 1-2, teaches intake and exhaust systems can be modeled using the pressure source as shown in Fig. 1-2);**

inserting into the model, by means of the computing device **(i.e. page 1172, § 4. Numerical Study, ¶ 2 of section, lines 1-2, teaches simulated source signal which necessitate a computing device)**, at least one single attenuating device **(i.e. page 1167, § 2.2. The Intake and Exhaust Noise, ¶ 2, line 3, teaches acoustial load (muffler).)**;

calculating, by means of the computing device **(i.e. page 1172, § 4. Numerical Study, ¶ 2 of section, lines 1-2, teaches simulated source signal which necessitate a computing device)**, an attenuating effect of the elements and an attenuating effect of the at least one single attenuating device relating to a sound pressure level of the high power combustion engine **(i.e. page 1175, § 5.1 Engine Noise Characteristics, ¶ 4 of section, lines 1-6, teaches comparison result of the normalized kurtosis between the simulated Gaussian distributions and the measure acoustic signals.)**;

repeating the inserting and calculating step **(i.e. page 1175, § 5.1 Engine Noise Characteristics, ¶ 4 of section, lines 1-7, teaches the acoustic signals are measured from the test engine under different speed and load conditions with a total of 160 measurements.)**

Li teaches simulating and modeling (pg. 1167):

In practice, a diesel engine has numerous resonance frequencies because most mechanical parts inside the engine can be simulated by the above model [11]. For example, the theoretical analysis indicates that the crankcase walls may have more than 20 resonance frequencies in a narrow-frequency band. The system responses are rather complex. One of the reasons is due to the numerous numbers of the excitation forces. Another reason is that most of the excitation forces are the non-stationary impacts in nature. Hence, the overall system response is a combination of all the individual responses expressed as [12].

2.2. THE INTAKE AND EXHAUST NOISE

The intake and exhaust systems can be modelled using the pressure source as shown in Fig. 2 [14, 15].

In this model, P_s and u_s represent the source pressure and volume velocity, Z_s is the internal impedance of the source, p_1 and u_1 are the volume pressure and velocity before adding the acoustical load (muffler) while p_2 and u_2 are the corresponding pressure and

11. Although Li teaches a plurality of elements, Li does not expressly disclose the plurality of elements where each element comprises a first reactive part, a resistive part and a second reactive part; and at least one single attenuating device mounted as channel parts along the exhaust system.

12. Johansson, however, discloses where each element comprises a first reactive part, a resistive part and a second reactive part **(Fig. 1 and col. 5, lines 23-24)**; and at least one single attenuating device mounted as channel parts along the exhaust system **(col. 8, lines 22-24, teaches channel 15 arranged on the inside of the container is to permit the passage of a partial amount of the hot exhaust gases flowing through the sound attenuator)**. This teaching is in the context of **tuning** models. For example, see:

Col. 3, lines 46-49:

The **sound-reducing effect** shall be capable of being **tuned** with respect to the acoustic boundary conditions present in the system and be less sensitive to frequency

variations.

Col. 4, lines 42-47:

The present invention makes use of this in such a way that the position of the node is used for **determining an optimum length of a reflection attenuator which may include also resistive attenuation properties** and the **best location of the orifice** of a reactive attenuator.

Col. 5, lines 2-10:

The method described also makes it possible to **optimally arrange the quarter-wave attenuator** to an extent coinciding with that of the channel...
and that, by the choice of location, attenuators with predictable, **optimized attenuating properties** may be constructed.

Col. 5, lines54-57:

...This results in a slender channel system with a uniform thickness, which permits the exhaust system to be accommodated within an **optimum space saving** overall volume.

Col. 6, lines 59-64:

...Thus, if it is placed a quarter of a wavelength from a reflection attenuator, its effect becomes **optimal**. When placing it before or after a resistive attenuator, its sound reducing capacity and bandwidth at low frequencies ***may be optimized by a suitable choice of resistive length and reactive length***.

Col. 7, lines 12-24:

The reactive attenuator *3h* and *3d,* respectively, which is placed first in the flow direction is **adapted to be tuned** to the lower limit frequency of the frequency band. The

reactive attenuator 3c and *3e,* respectively, placed after the resistive reflection attenuator is **adapted to be tuned** to the upper limit frequency of the frequency band. …The reactive length a3 and b3, respectively, is **adapted to correspond to a quarter of a wavelength of the** upper limit frequency.

13. Li and Johansson et al are analogous art because they are from similar field of endeavor of sound reduction in a transport system. At the time of the invention it would have been obvious to person of ordinary skill in the art to utilize the attributes of the transport system for gas composed of resistive and reactive attenuators discussed by Johansson in the independent component analysis model discussed by Li for the purpose of producing a transport system for gas from which the sound emission is less than from conventionally known systems **(Johansson et al: col. 3, lines 35-37)**.

14. Li and Johansson do not expressly disclose the sound pressure level of the high power combustion engine is attenuated below a predetermined level; and assembling the system for sound attenuation, wherein a measured noise level at the close vicinity of an outlet is below the predetermined noise level.

15. Galaitsis, however, discloses the sound pressure level of the high power combustion engine is attenuated below a predetermined level **(col. 4, lines 4-9 and col. 5, lines 56-65, teaches noise from the engine are selectively accumulated and confined in at least one accumulator, for a time sufficient to attenuate the exhaust noise by ringdown. Galaitsis teaches "ringdown" means the process by which noise (acoustic energy) effectively confined within a defined volume, such as an accumulator, naturally decays over time. Col. 6, lines 58-61, teaches most**

preferably $T_{ringdown}$ is sufficient to substantially eliminate the noise by ringdown.); and assembling the system for sound attenuation, wherein a measured noise level at the close vicinity of an outlet is below the predetermined noise level **(col. 3, lines 14-26, teaches noise attenuator**

including a plurality of accumulators arranged in series and collectively providing a transmittance path for compressible flow mass and noise ... thereby attenuating exhaust noise within the at least one accumulator by ringdown.).

16. Li, Johansson, and Galaitsis are analogous art because they are from similar field of endeavor of sound reduction in a transport system. At the time of the invention it would have been obvious to person of ordinary skill in the art to utilize the attributes of the transport system for gas composed of resistive and reactive attenuators discussed by Johansson with the principle of arranging attenuator to achieve ringdown as discussed by Galaitsis in combination with the independent component analysis model discussed by for the purpose of analyzing an improved system for attenuating noise where the length of time the sound waves take to propagate through the length of the transmittance path is not a factor **(Galaitsis: col. 2, lines 37-46)**.

17. ***Li discloses:*** As per claim 2 (currently amended), a method according to claim 1, wherein calculating the attenuation effect of the elements further comprises calculating an attenuation effect for a band of frequencies corresponding to intermediate frequencies for one or more of the elements **(i.e. page 1167, § 2.1 The combustion and Mechanical Induced Noise, ¶ 5 of section, lines 1-7 and Fig 5, teaches separation of sound frequencies.)**.

18. ***Li discloses:*** As per claim 3 (currently amended), a method according to claim 2, wherein calculating the attenuation effect for the band of frequencies corresponding to the intermediate frequencies for one or more of the elements further comprises calculating the attenuation effect for the band of frequencies using four-pole theory and power flow models **(Fig. 2 and page 1168, § 2.2. The Intake and Exhaust Noise, ¶ 2, lines 4-5, teaches a model based on four-pole theory where the four-pole coefficients A, B, C and D represent the transfer characteristics of the muffler (i.e. attenuation effect contributed of the muffler))**.

19. ***Johansson discloses:*** As per claim 4 (currently amended), a method according to claim 1 or 3 wherein the at least one single reactive attenuating device is positioned at an odd number of a quarter of a wavelength from a distinct impedance **(col. 4, lines 48-55, teaches to obtain a good attenuating effect at a certain frequency of the sound, a quarter-wave attenuator is thus to be placed with its orifice in a position which is a quarter of a wavelength away from the area increase)**, and wherein the wavelength is the single attenuating device's tuned frequency **(col. 6, lines 15-27, teaches quarter-wave attenuator. See also col. 7, lines 13-24, teaches the reactive attenuator is adapted to be tuned such as to a lower limit frequency of the frequency band.)**.

20. ***Li discloses:*** As per claim 5. (currently amended), a method according to claim 4, further comprising calculating a pressure drop along the exhaust system **(i.e. § 2.2.**

The Intake and Exhaust Noise, ¶ 3, lines 1-4, teaches propagation of the source pressure can be calculated).

21. ***Johansson discloses:*** As per claim 6 (currently amended), a method according to 1, wherein the minimum length of the exhaust system is 8 meters, and wherein the effect of the combustion engine is greater than 500 kW **(col. 5, lines 30-37, teaches exhaust system for a diesel engine on a ship).**

22. ***Johansson discloses:*** As per claim 7 (currently amended), a method according to claim 6 where the exhaust system comprises a heat exchanger or boiler **(col. 3, lines 44-46, teaches system comprising exhaust gas boiler)**, which reduces the temperature of the exhaust gas in the exhaust system and therefore the wavelength of the sound decreases after the heat exchanger or boiler **(col. 8, lines 22-33)**, and the at least one single attenuating device is positioned in an odd number of a quarter of the wavelength from the outlet of the heat exchanger or boiler**(col. 4, lines 48-55, teaches to obtain a good attenuating effect at a certain frequency of the sound, a quarter-wave attenuator is thus to be placed with its orifice in a position which is a quarter of a wavelength away from the area increase)**, and where the wavelength is the single attenuating device's tuned frequency **(col. 6, lines 15-27, teaches quarter-wave attenuator. See also col. 7, lines 13-24, teaches the reactive attenuator is adapted to be tuned such as to a lower limit frequency of the frequency band.)** .

23. ***Li discloses:*** As per claim 11, a system for attenuating noise in an exhaust system of a high power combustion engine, the system comprising:

adding, in a computerized model of the exhaust system by means of a program executed by a processor **(i.e. page 1172, § 4. Numerical Study, ¶ 2 of section, lines 1-2, teaches simulated source signal which necessitate a computing device)**, a plurality of elements **(i.e. Fig. 2 and page 1167, § 2.2. The Intake and Exhaust Noise, ¶ 1, lines 1-2, teaches intake and exhaust systems can be modeled using the pressure source as shown in Fig. 1-2)**;

inserting, into the computerized model of the exhaust system by means of the program **(i.e. page 1172, § 4. Numerical Study, ¶ 2 of section, lines 1-2, teaches simulated source signal which necessitate a computing device)**, a single attenuating device representing one of the number of single attenuating devices **(i.e. page 1167, § 2.2. The Intake and Exhaust Noise, ¶ 2, line 3, teaches acoustial load (muffler).)**;

calculating, with the processor **(i.e. page 1172, § 4. Numerical Study, ¶ 2 of section, lines 1-2, teaches simulated source signal which necessitate a computing device)** an estimated sound pressure level at a first location in the model exhaust system based upon an attenuation effect due to the addition of the plurality of model attenuating elements and the insertion of the model single attenuating device into the model exhaust system **(Fig. 2 and page 1168, § 2.2. The Intake and Exhaust Noise, ¶ 2, lines 4-5, teaches a model based on four-pole theory where the four-pole coefficients A, B, C and D represent the transfer characteristics of the muffler (i.e. attenuation effect contributed of the muffler)**; and

repeating the inserting and calculating step **(i.e. page 1175, § 5.1 Engine Noise Characteristics, ¶ 4 of section, lines 1-7, teaches the acoustic signals are**

measured from the test engine under different speed and load conditions with a total of 160 measurements.).

Li teaches simulating and modeling (pg. 1167):

> In practice, a diesel engine has numerous resonance frequencies because most mechanical parts inside the engine can be simulated by the above model [11]. For example, the theoretical analysis indicates that the crankcase walls may have more than 20 resonance frequencies in a narrow-frequency band. The system responses are rather complex. One of the reasons is due to the numerous numbers of the excitation forces. Another reason is that most of the excitation forces are the non-stationary impacts in nature. Hence, the overall system response is a combination of all the individual responses expressed as [12].
>
> 2.2. THE INTAKE AND EXHAUST NOISE
>
> The intake and exhaust systems can be modelled using the pressure source as shown in Fig. 2 [14, 15].
>
> In this model, P_s and u_s represent the source pressure and volume velocity, Z_s is the internal impedance of the source, p_1 and u_1 are the volume pressure and velocity before adding the acoustical load (muffler) while p_2 and u_2 are the corresponding pressure and

24. Li does not expressly disclose a first number of single attenuating devices and a second number of attenuating elements, where each attenuating element further comprises a first reactive part, a resistive part and a second reactive part, and the first number of attenuating devices and the second number of attenuating elements are arranged in a channel of the exhaust system such that a measured noise level at an outlet of the channel is attenuated below a predetermined noise level; and, wherein the first number of attenuating devices and the second number of attenuating elements are determined and arranged in the exhaust system.

25. Johansson, however, discloses a first number of single attenuating devices and a second number of attenuating elements, where each attenuating element further

comprises a first reactive part, a resistive part and a second reactive part **(Fig. 1 and col. 5, lines 23-24)**;, and

the first number of attenuating devices and the second number of attenuating elements are arranged in a channel of the exhaust system **(col. 8, lines 22-24, teaches channel 15 arranged on the inside of the container is to permit the passage of a partial amount of the hot exhaust gases flowing through the sound attenuator);** and, wherein the first number of attenuating devices and the second number of attenuating elements are determined and arranged in the exhaust system **(col. 8, lines 22-24, teaches channel 15 arranged on the inside of the container is to permit the passage of a partial amount of the hot exhaust gases flowing through the sound attenuator).** This teaching is in the context of **tuning** models. For example, see:

Col. 3, lines 46-49:

The **<u>sound-reducing effect</u>** shall be capable of being **<u>tuned</u>** with respect to the acoustic boundary conditions present in the system and be less sensitive to frequency variations.

Col. 4, lines 42-47:

The present invention makes use of this in such a way that the position of the node is used for **<u>determining an optimum length of a reflection attenuator which may include also resistive attenuation properties</u>** and the **<u>best location of the orifice</u>** of a reactive attenuator.

Col. 5, lines 2-10:

The method described also makes it possible to **<u>optimally arrange the quarter-wave</u>**

attenuator to an extent coinciding with that of the channel…

and that, by the choice of location, attenuators with predictable, **optimized attenuating properties** may be constructed.

Col. 5, lines54-57:

…This results in a slender channel system with a uniform thickness, which permits the exhaust system to be accommodated within an **optimum space saving** overall volume.

Col. 6, lines 59-64:

…Thus, if it is placed a quarter of a wavelength from a reflection attenuator, its effect becomes **optimal**. When placing it before or after a resistive attenuator, its sound reducing capacity and bandwidth at low frequencies ***may be optimized by a suitable choice of resistive length and reactive length***.

Col. 7, lines 12-24:

The reactive attenuator *3h* and *3d,* respectively, which is placed first in the flow direction is **adapted to be tuned** to the lower limit frequency of the frequency band. The reactive attenuator 3c and *3e,* respectively, placed after the resistive reflection attenuator is **adapted to be tuned** to the upper limit frequency of the frequency band. …The reactive length a3 and b3, respectively, is **adapted to correspond to a quarter of a wavelength of the** upper limit frequency.

26. Li and Johansson et al are analogous art because they are from similar field of endeavor of sound reduction in a transport system. At the time of the invention it would have been obvious to person of ordinary skill in the art to utilize the attributes of the transport system for gas composed of resistive and reactive attenuators discussed by

Johansson in the independent component analysis model discussed by Li for the purpose of producing a transport system for gas from which the sound emission is less than from conventionally known systems **(Johansson et al: col. 3, lines 35-37)**.

27. Li and Johansson do not expressly disclose a measured noise level at an outlet of the channel is attenuated below a predetermined noise level; and estimating sound pressure level at a location of an exhaust system is attenuated below the predetermined attenuation level.

Galaitsis, however, discloses a measured noise level at an outlet of the channel is attenuated below a predetermined noise level **(col. 4, lines 4-9 and col. 5, lines 56-65, teaches noise from the engine are selectively accumulated and confined in at least one accumulator, for a time sufficient to attenuate the exhaust noise by ringdown. Galaitsis teaches "ringdown" means the process by which noise (acoustic energy) effectively confined within a defined volume, such as an accumulator, naturally decays over time. Col. 6, lines 58-61, teaches most preferably $T_{ringdown}$ is sufficient to substantially eliminate the noise by ringdown.)**; and estimating sound pressure level at a location of an exhaust system is attenuated below the predetermined attenuation level **(col. 5, line 66 to col. 6, line 8, teaches "minimum ring down time", means he minimum time required for noise effectively confined in a defined volume such as an accumulator, to decay by a desired amount through ringdown.)**.

28. Li, Johansson, and Galaitsis are analogous art because they are from similar field of endeavor of sound reduction in a transport system. At the time of the invention it

would have been obvious to person of ordinary skill in the art to utilize the attributes of the transport system for gas composed of resistive and reactive attenuators discussed by Johansson with the principle of arranging attenuator to achieve ringdown as discussed by Galaitsis in combination with the independent component analysis model discussed by for the purpose of analyzing an improved system for attenuating noise where the length of time the sound waves take to propagate through the length of the transmittance path is not a factor **(Galaitsis: col. 2, lines 37-46)**.

Response to Arguments

29. Applicant's arguments filed 02/3/2011 have been fully considered but they are not persuasive. It is noted that Applicant's arguments are piecemeal because they only provide arguments for Li, and are silent on the remaining art of the 103 rejections. The teaching of Johansson is noted prior to addressing Applicant's arguments.

30. Johansson (one of the ***instant inventors***) teaches '**tuning**' models, in the same context. For example, see col. 3, lines 46-49:

The **sound-reducing effect** shall be capable of being **tuned** with respect to the acoustic boundary conditions present in the system and be less sensitive to frequency variations. Also see the other cites, as presented in the rejections.

31. The Examiner's responses to Applicant's arguments are provided below:

Applicants Argue (pp. 7-8):

Claim 1 is directed to a method for supplying a system for sound attenuation of noise relating to an exhaust system of exhaust gases from a high power combustion engine, the method includes at least the following:

--Claim 1 recited--

In rejecting claim **1**, the Examiner asserts that the "simulated source signals" disclosed in *Li* teach the "computing device" of claim 1. (Final Action at 3) Applicants respectfully submit, however, that the "simulated source signals" of *Li* do not teach the computing device of Applicants' invention. In particular, *Li* makes it clear that the "simulated source signals" are "acoustic signals generated from a test diesel engine using the ICA in an effort to identify its noise sources." (see *Li* p. 1166 ll. 26-27). Applicants respectfully submit that the source signals do not necessitate a computing device, because *Li* explicitly teaches that the source signals represent signals from a test diesel engine. In fact, the section cited by the Examiner is merely a numerical example "[to prove the validity of the proposed ICA method." (see *Li* **p.** 1172 ll. 19-20) *Li* does not teach how to supply a system for sound attenuation as disclosed in Applicants' invention.

Examiner Response:

This is not persuasive. Li teaches simulating and modeling (pg. 1167):

> In practice, a diesel engine has numerous resonance frequencies because most mechanical parts inside the engine can be simulated by the above model [11]. For example, the theoretical analysis indicates that the crankcase walls may have more than 20 resonance frequencies in a narrow-frequency band. The system responses are rather complex. One of the reasons is due to the numerous numbers of the excitation forces. Another reason is that most of the excitation forces are the non-stationary impacts in nature. Hence, the overall system response is a combination of all the individual responses expressed as [12].
>
> 2.2. THE INTAKE AND EXHAUST NOISE
>
> The intake and exhaust systems can be modelled using the pressure source as shown in Fig. 2 [14, 15].
>
> In this model, P_s and u_s represent the source pressure and volume velocity, Z_s is the internal impedance of the source, p_1 and u_1 are the volume pressure and velocity before adding the acoustical load (muffler) while p_2 and u_2 are the corresponding pressure and

Johansson teaches optimal arrangement of the attenuating devices **(Fig. 1-2 and col. 5, lines 23-24)**; and

Col. 4, lines 42-47:

The present invention makes use of this in such a way that the position of the node is used for **determining an optimum length of a reflection attenuator which may include also resistive attenuation properties** and the **best location of the orifice** of a reactive attenuator.

Col. 5, lines 2-10:

The method described also makes it possible to **optimally arrange the quarter-wave attenuator** to an extent coinciding with that of the channel... and that, by the choice of location, attenuators with predictable, **optimized attenuating properties** may be constructed.

Applicants Argue (pg. 8):

Moreover, *Li* discloses a simple circuit (see *Li* **p.** 1167, Fig 1(b)) that simulates the test engine. The simple circuit disclosed in *Li*, which merely discloses a resistor, a conductor, and an inductor, is not a computing device. Each element of Applicants' invention is simulated via "**software objects**" that would not have been obvious to one of ordinary skill in the art from the simple circuit disclosed in *Li*. (see Applicants' disclosure at **p.** 13, 11. 1-2).

Examiner Response:

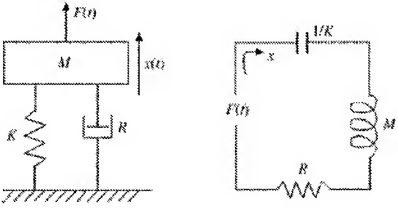
The Examiner agrees – it is not a computing device, - and it was never alleged to be.

The fig. is discussed on pg. 1166:

2.1. THE COMBUSTION AND MECHANICAL INDUCED NOISE

The structure of a diesel engine can be simplified to a one-degree-of-freedom system as shown in Fig. 1(a) [1]. The equivalent electrical circuit of the model is given in Fig. 1(b). In the case of the combustion-induced noise, the acting force is composed of the gas excitation, inertia and friction forces. The mechanical-induced noise model considers the reversible force due to the engine crank mechanism and inertia force.

Fig. 1b is the equivalent **model** for induced acoustic noise in the engine - that is simulated **on** a computer. It is **not** the device upon which the simulation takes place. This point is repeated on pg. 1167, line 1.



(a) (b)

Figure 1. The combustion and mechanical-induced noise model: (a) simplified mechan
lectrical circuit.

The mechanical impedance of the above model is given by

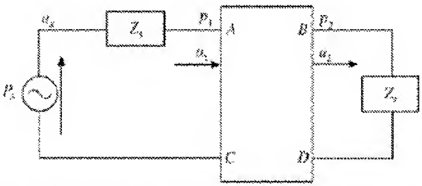
Compare the above caption to the preamble of claim 1.

The significance of the argument with respect to '*software objects*' is not clear. Simulation via 'software objects' merely means that the simulation/modeling is carried out on a computer (the specification provides no other meaning). In any case, broadly claiming an automated means (simulated via 'software objects') to replace a manual function to accomplish the same result does not typically distinguish over the prior art.

Implementing a known function on a computer has been deemed obvious if the automation of the known function on a general purpose computer is nothing more than a predictable use of prior art elements according to their established functions.

Applicants discuss fig. 1, but do not discuss Fig. 2 of Li, as per the rejection:

W. LI ET AL.



The equivalent electrical circuit representation of the intake and exhaust systems.

It is also noted that simulat* (simulation, simulating, etc.) is not recited in the claims.

Applicants Argue (pp. 8-9):

The Examiner further relies on certain paragraphs of *Li* to allege that it teaches "calculating, by means of the computing device, an attenuating effect of the elements and an attenuating effect of the at least one single attenuating device relating to a sound pressure level of the high power combustion engine" (Final Action at 4). Applicants respectfully submit that the paragraphs cited by the Examiner do not teach the aforementioned calculating step of claim **1.**

Instead *Li* discloses the types of simulated source signals used to demonstrate how the independent component analyzes works. *Li* merely demonstrates how acoustic signals are measured from the test engine

under different speed and load conditions (see *Li* **p.** 1175, 11. 26-28.) *Li* compares the normalized kurtosis of generated Gaussian distributions to the normalized kurtosis of the measured acoustic signals. (see *Li* **p.** 1175, 11. 23-28.) The point of this comparison is to confirm that the source signals are non-Gaussian so that the independent component analyzes can be applied, since it cannot be applied to Gaussian distributed signals. (see *Li* p. **1175, 11.** 1-4 and Figs. 6(a)-(b).)

Thus, Applicants respectfully submit that one of ordinary skill in the art could not have conceived calculating, by means of the computing device, an attenuating effect of the elements and an attenuating effect of the at least one single attenuating device relating to a sound pressure level of the high power combustion engine, from the paragraph relied on by the Examiner.

Examiner Response:

This is a piecemeal argument. In any case, Applicants have not explained why the teaching of the statistical analysis in Li, supports the alleged conclusion. The point of the statistical analysis is to determine the origins of the individual contributions to the aggregate noise - ***during the simulation***. This argument is not relevant with respect to the claimed invention.

32. In summary, Li teaches simulating and modeling (pg. 1167):

> In practice, a diesel engine has numerous resonance frequencies because most mechanical parts inside the engine can be simulated by the above model [11]. For example, the theoretical analysis indicates that the crankcase walls may have more than 20 resonance frequencies in a narrow-frequency band. The system responses are rather complex. One of the reasons is due to the numerous numbers of the excitation forces. Another reason is that most of the excitation forces are the non-stationary impacts in nature. Hence, the overall system response is a combination of all the individual responses expressed as [12]

2.2. THE INTAKE AND EXHAUST NOISE

The intake and exhaust systems can be modelled using the pressure source as shown in Fig. 2 [14, 15].

In this model, P_s and u_s represent the source pressure and volume velocity, Z_s is the internal impedance of the source, p_1 and u_1 are the volume pressure and velocity before adding the acoustical load (muffler) while p_2 and u_2 are the corresponding pressure and

Johansson teaches optimal arrangement of the attenuating devices **(Fig. 1-2 and col. 5, lines 23-24)**;

Col. 4, lines 42-47: The present invention makes use of this in such a way that the position of the node is used for **determining an optimum length of a reflection attenuator which may include also resistive attenuation properties** and the **best location of the orifice** of a reactive attenuator.

Col. 5, lines 2-10: The method…makes it possible to **optimally arrange the quarter-wave attenuator** to an extent coinciding with that of the channel… and that, by the choice of location, attenuators with predictable, **optimized attenuating properties** may be constructed.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hugh Jones whose telephone number is (571) 272-3781. The examiner can normally be reached on M-Th.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah can be reached on (571) 272-2279. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Hugh Jones/

Primary Examiner, Art Unit 2128